

AMENDMENT TO THE CLAIMS

Please amend the presently pending claims as follows:

1. (Currently Amended) A process of placing objects, including flip-flop cells and logic cells, in a rectangle comprising steps of:

- a) obtaining approximate delays for paths in a design;
- b) creating clusters of logic cells and flip-flop cells, comprising:
 - b1) creating a cluster for each flip-flop cell,
 - b2) creating a cluster for each logic cell for which there is no path that comprises the logic cell and begins or ends at a flip-flop cell, and
 - b3) for each logic cell for which there is at least one path, including a longest path, that comprises the logic cell and begins or ends at a flip-flop cell, assigning the logic cell to the cluster of either the flip-flop cell at which the longest path begins or ends; and
- ~~a)c) placing the objects clusters in the rectangle;~~
- ~~b)d) evaluating coordinates of the objectsclusters; and~~
- ~~e)e) adjusting the coordinates of the objectsclusters to establish a substantially uniform density of objects clusters in the rectangle.~~

2. (Currently Amended) The process of ~~claim 1~~claim 8, further comprising:

- ~~d)f) after step ~~e)~~ e), evaluating coordinates of the objectsclusters, and~~
- ~~e)g) re-positioning objects at least one of the clusters.~~

3. (Currently Amended) The process of claim 2, wherein the objects include fixed objects and non-fixed objects, and step ~~b)d)~~ is applied to non-fixed objects and step ~~d)f)~~ is applied to

fixed and non-fixed objects.

4. (Currently Amended) The process of ~~claim 1~~ claim 8, wherein the objects include fixed objects and non-fixed objects, and step ~~b)~~d) is applied to non-fixed objects.

5. (Currently Amended) The process of ~~claim 1~~claim 8, wherein the objects include wires and cells connected by wires and step ~~b)~~d) comprises:

~~b1)~~d1) evaluating wire coordinates based on cell coordinates, and

~~b2)~~d2) evaluating cell coordinates based on wire coordinates.

6. (Currently Amended) The process of ~~claim 1~~claim 8, wherein the objects include wires and cells connected by wires and step ~~b)~~d) comprises:

~~b1)~~d1) assigning wires to positions between cells to which the respective wire is connected, and

~~b2)~~d2) assigning new cell coordinates to connect the cells to their respective wires.

7. (Currently Amended) The process of ~~claim 1~~claim 8, wherein step ~~e)~~e) comprises:

~~e1)~~ e1) dividing the rectangle into first and second rectangles having equal free areas,

~~e2)~~ e2) dividing the rectangle into third and fourth rectangles having equal areas of objects, and

~~e3)~~ e3) adjusting coordinates of the ~~objects~~clusters based on boundaries between the first and second rectangles and between the third and fourth rectangles.

8. (Currently Amended) The process of claim 1, ~~wherein the~~

~~objects are megacells, logic cells and flip-flop cells, and the process is applied to placing the megacells, logic cells and flip-flop cells an integrated circuit, the process further comprising:~~

~~d) before step a) creating clusters of logic cells and flip-flop cells~~

d) evaluating coordinates of the clusters; and

e) adjusting the coordinates of the clusters to establish a substantially uniform density of objects clusters in the rectangle.

9. Canceled.

10. (Currently Amended) The process of ~~elaim~~claim 1, wherein step ~~d3~~b3 comprises:

if the longest path begins and ends at respective flip-flop cells, assigning the corresponding logic cell to the cluster of the flip-flop cell closest to the logic cell, and

if the longest path begins or ends, but not both, at a flip-flop cell, assigning the corresponding logic cell to the cluster of the flip-flop cell.

11. (Currently Amended) A process of creating a substantially uniform density of ~~objects~~ clusters in a rectangle comprising steps of:

a) obtaining approximate delays for paths in a design;

b) creating clusters of logic cells and flip-flop cells, comprising:

b1) creating a cluster for each flip-flop cell,

b2) creating a cluster for each logic cell for which there is no path that comprises the logic cell and begins or ends at a flip-flop cell, and

b3) for each logic cell for which there is at least one path, including a longest path, that comprises

the logic cell and begins or ends at a flip-flop cell, assigning the logic cell to the cluster of either the flip-flop cell at which the longest path begins or ends;

- c) placing the clusters in the rectangle,
- a)d) dividing the rectangle into first and second rectangles having equal free areas,
- b)e) dividing the rectangle into third and fourth rectangles having equal areas of ~~objects~~clusters, and
- e)f) adjusting coordinates of the ~~objects~~clusters based on boundaries between the first and second rectangles and between the third and fourth rectangles.

12. (Currently Amended) A computer usable medium having a computer readable program embodied therein for addressing data to place representations of objects, including logic cells and flip-flop cells in a representation of a rectangle, the computer readable program comprising:

first computer readable program code comprising:

computer readable program code for creating a cluster for each flip-flop cell,

computer readable program code for creating a cluster for each logic cell for which there is no path that comprises the logic cell and begins or ends at a flip-flop cell, and

computer readable program code for assigning each logic cell for which there is at least one path, including a longest path, that comprises the logic cell and begins or ends at a flip-flop cell, to the cluster of either the flip-flop cell at which the longest path begins or ends;

~~first~~second computer readable program code for causing the computer to place representations of the

objectsclusters in the representation of the rectangle;
~~second~~third computer readable program code for causing the
computer to evaluate coordinates of the
objectsclusters; and
~~third~~fourth computer readable program code for causing the
computer to adjust the coordinates of the
objectsclusters to establish a substantially uniform
density of representations of objectsclusters in the
representation of the rectangle.

13. (Currently Amended) The computer usable medium of claim
12, further comprising:

~~fourth~~fifth computer readable program code for causing the
computer to evaluate the adjusted coordinates of the
objectsclusters, and

~~fifth~~sixth computer readable program code for causing the
computer to re-position the representations of the
objectsclusters.

14. (Currently Amended) The computer usable medium of claim
13, wherein the objects include fixed objects and non-fixed
objects, and the ~~second~~third computer readable program code is
applied to representations of non-fixed objects and the
~~fourth~~fifth computer readable program code is applied to
representations of fixed and non-fixed objects.

15. (Currently Amended) The computer usable medium of claim
12, wherein the objects include fixed objects and non-fixed
objects, and the ~~second~~third computer readable program code is
applied to representations of non-fixed objects.

16. (Currently Amended) The computer usable medium of claim
12, wherein the objects include wires and cells connected by

wires and the ~~second~~third computer readable program code comprises:

computer readable program code for causing the computer to evaluate wire coordinates based on ~~cell~~cluster coordinates, and

computer readable program code for causing the computer to evaluate ~~cell~~cluster coordinates based on wire coordinates.

17. (Currently Amended) The computer usable medium of claim 12, wherein the ~~third~~fourth computer readable program code comprises:

computer readable program code for causing the computer to divide the representation of the rectangle into representations of first and second rectangles having equal free areas;

computer readable program code for causing the computer to divide the representation of the rectangle into representations of third and fourth rectangles having equal areas of ~~objects~~clusters, and

computer readable program code for causing the computer to adjust coordinates of the ~~objects~~clusters based on boundaries between the representations of the first and second rectangles and between the representations of the third and fourth rectangles.

18. Canceled.

19. (Currently Amended) The computer usable medium of claim ~~18~~12, wherein the ~~fourth~~first computer readable program code further comprises:

~~computer readable program code for causing the computer to create a representation of a cluster for each flip-flop cell, assigning the logic cell to the cluster of the flip-flop cell closest to the logic cell if the longest path begins and ends at respective flip-flop cells, and for assigning the logic~~

cell to the cluster of the flip-flop cell if the longest path begins or ends, but not both, at a flip-flop cell

~~computer readable program code for causing the computer to create a representation of a cluster for each logic cell in a path that does not terminate at a flip flop cell, and~~

~~—— computer readable program code for causing the computer to assign a representation of each logic cell in a path that terminates at a flip flop cell to the representation of the cluster of a flip flop cell at the termination of the respective path.~~